

PLOTNIKOV, V.I. [deceased]

Heterosis as one of the obvious causes of mass propagation of
locusts. Trudy Inst. zool. AN Kazakh. SSR 18:201-204 '62.
(MIRA 17:3)

89526

S/039/61/053/002/001/003
C111/C222

16.4900

AUTHOR: Plotnikov, V.I. (Dzerzhinsk)

TITLE: On the continuity of regular and quasiregular functionals of the calculus of variations

PERIODICAL: Matematicheskiy sbornik, vol.53, no.2, 1961, 137-158

TEXT: The author uses the results and notations of (Ref.1: V.I.Plotnikov, O polunepreryvnosti funktsionalov variatsionnogo ischisleniya [On the semicontinuity of functionals of the calculus of variations] Matem.sb. 52 (94) (1960), 799-810.

§ 1. On the continuity of regular functionals (non-parametric case).
Theorem 1: Let the function $F(\vec{x}, \vec{v}, \vec{w})$ have the same properties as the analogous function of the theorem of § 1 of the paper (Ref.1) and besides let it be strongly convex in the components of the vector $\vec{w}$. Let the $\{\vec{v}_n(\vec{x})\}$ and $\{\vec{w}_n(\vec{x})\}$ ($n=0,1,\dots$) have the same properties as in theorem 1 of (Ref.1) and let

$$\int_G F(\vec{x}, \vec{v}_n, \vec{w}_n) d\Omega \rightarrow \int_G F(\vec{x}, \vec{v}_0, \vec{w}_0) d\Omega < +\infty \quad \text{for } n \rightarrow \infty.$$

Then the sequence of functions $\{\vec{w}_n(\vec{x})\}$ converges with respect to the

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On the continuity of regular...

measure to $\vec{w}_0(\vec{x})$ in G.

Theorem 2: Let $F(\vec{x}, \vec{v}, \vec{w})$ be a function satisfying the conditions of

theorem 1. Let $\{\vec{v}_n(\vec{x})\}$ and $\{\vec{w}_n(\vec{x})\}$ be sequences as in theorem 1. Let

furthermore $\phi(\vec{x}, \vec{v}, \vec{w})$ be a function continuous in all arguments which is defined there where F is defined and which satisfies the condition: there exist constants L and R > 0 so that

$$|\phi(\vec{x}, \vec{v}, \vec{w})| \leq LF(\vec{x}, \vec{v}, \vec{w}) + R$$

for all $\vec{x} \in \bar{G}$, $\vec{v} \in R^1$, $\vec{w} \in R^m$. Then:

$$\int_G |\phi(\vec{x}, \vec{v}_n(\vec{x}), \vec{w}_n(\vec{x})) - \phi(\vec{x}, \vec{v}_0(\vec{x}), \vec{w}_0(\vec{x}))| d\Omega \rightarrow 0 \text{ for } n \rightarrow \infty$$

if

$$(\vec{v}_n, \vec{w}_n, F, G) \xrightarrow{n \rightarrow \infty} (\vec{v}_0, \vec{w}_0, F, G) < +\infty.$$

§ 2. On the continuity of quasiregular functionals (parametric case).

Let the function $F(x, A)$ be defined for all $x \in G \subset R^3$ and all $A \subset R^3$, and let it have the properties

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On the continuity of regular...

1.1. F and $\frac{\partial F}{\partial w_j}$ are continuous in all arguments for $\|A\| \neq 0$

1.2. $F(x, kA) = kF(x, A)$ for all $k > 0$

1.3. $F(x, A) > 0$ if $\|A\| \neq 0$

1.4. $F(x, A_1 + A_2) \leq F(x, A_1) + F(x, A_2)$ for all $x \in G$, $A_1 \in R^3$, $A_2 \in R^3$ (quasi-regularity).

Let the surface

$$x \equiv f(u) \equiv \{f^1(u), f^2(u), f^3(u)\}$$

$$u = (u^1, u^2) \in K = [0, 1; 0, 1], \quad x \in R^3$$

belong to the class $L^{(2)}$ if $f^i(u^1, u^2) \in A^2$ ($i=1, 2, 3$). Almost everywhere in K there exist the $I_f^1 = \frac{D(f^2, f^3)}{D(u^1, u^2)}$ etc for such a surface. Let

$A_f(u) = \{I_f^1(u), I_f^2(u), I_f^3(u)\}$. If $f(u) \in L^{(2)}$ then the quasiregular integral $\iint_K F(f(u), A_f(u)) du$ is always finite. Let two quasiregular

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On the continuity of regular...

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functionals with the integrands F_1 and F_2 belong to the same class if from

$$F_1(x, A_1) + F_1(x, A_2) = F_1(x, A_1 + A_2) \quad (2.1)$$

it follows

$$F_2(x, A_1) + F_2(x, A_2) = F_2(x, A_1 + A_2) \quad (2.2)$$

and reversely.

Theorem: Let the functions $F_1(x, A), F_2(x, A)$, $x \in G$, where $\bar{G} \subset \mathbb{R}^3$ is a closed bounded region and $A \subset \mathbb{R}^3$, have the properties 1.1.-1.4. Let the sequence of the surfaces $f_n(u)$, $u \in K = [0, 1; 0, 1]$ $f_n(u) \in \bar{G}$ ($n=0, 1, \dots$) satisfy the properties

a) $f_n(u) \in L^{(2)} \quad (n=0, 1, \dots),$

b) $D(f_n(u)) = \int_K \left\{ \sum_{i,j} \left(\frac{\partial f_n^i}{\partial u_j} \right)^2 \right\} du < L,$

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On the continuity of regular...

c) $\max_{u \in K} \|f_n(u) - f_0(u)\| \rightarrow 0$ for $n \rightarrow \infty$.

If then the integrals (f, K, F_1) and (f, K, F_2) belong to the same class then from the convergence

$$(f_n, K, F_1) \rightarrow (f_0, K, F_1) \quad \text{for } n \rightarrow \infty \quad (2.3)$$

there follows the convergence

$$(f_n, K, F_2) \rightarrow (f_0, K, F_2) \quad \text{for } n \rightarrow \infty, \quad (2.4)$$

and reversely from (2.4) there follows the convergence (2.3).

The author mentions Yu.V.Glebskiy and A.G.Sigalov. There are 2 Soviet-bloc references.

SUBMITTED: January 22, 1959

X

Card 5/5

KUKHARKOVA, L.L., starshiy nauchnyy sotrudnik; FREYDLIN, Ye.M., kand.veter. nauk; PEROVA, P.V.; IL'YASHENKO, M.A.; TRUDOLYUBOVA, G.B., mladshiy nauchnyy sotrudnik; PLOTNIKOV, V.I.; KRASIL'NIKOV, R.I., starshiy nauchnyy sotrudnik; FITINGOV, S.N., starshiy nauchnyy sotrudnik; RUSANOV, R.S., mladshiy nauchnyy sotrudnik; KONUSPAYEVA, U.S., mladshiy nauchnyy sotrudnik; Prinimali uchastiye: YAKOVLEV, L.A., prof.; MITROFANOV, V.N.

Sanitary evaluation of the meat of sheep affected with brucellosis.
Trudy VNIIMP no.14:87-95 '62. (MIRA 16:8)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut myasnoy promyshlennosti (for Kukharkova, Freydlin, Perova, Il'yashenko, Trudolyubova, Plotnikov). 2. Kazakhskiy filial Vsesoyuznogo nauchno-issledovatel'skogo instituta myasnoy promyshlennosti (for Krasil'nikov, Fitingov, Rusanov, Konuspayeva). 3. Saratovskiy zooveterinarnyy institut (for Yakovlev). 4. Saratovskaya oblastnaya veterinarnaya bakteriologicheskaya laboratoriya (for Mitrofanov).

(Meat inspection) (Brucellosis in sheep)

L 23627-65 EWT(m)/EWP(t)/EWP(b) IJP(c) JD/JG/HLK

ACCESSION NR: AT5002791

5/0000/64/000/000/0248/0250

AUTHOR: Maksay, L. I.; Plotnikov, V. I.

TITLE: Determination of rhenum in the products of the copper and molybdenum industries

SOURCE: Vsesoyuznoye soveshchaniye po probleme reniya. 2d, Moscow, 1962. Reniy (Rhenium); trudy soveshchaniya. Moscow, Izd-vo Nauka, 1964, 248-250

TOPIC TAGS: rhenum determination, rhenum analysis, colorimetry, copper industry, molybdenum industry, column chromatography, thiocyanate complex

ABSTRACT: The article describes a technique for determining rhenum in the products of the copper and molybdenum industry, based on the existing methods of decomposition of the products, separation of rhenum from the interfering elements, and its colorimetric analysis. The initial rhenum-containing material was fused with sodium peroxide, the melt was leached with water, and the precipitated hydroxides were filtered off. The strongly basic anion exchange resin AV-17 was used in columns 0.7 cm in internal diameter to adsorb rhenum (VII) from alkaline solutions, and N perchloric acid was found to be the best eluent. The influence of molybdenum on the adsorption and desorption of rhenum was

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studied; it was noticeable even when the Re:Mo ratio was as low as $1:10^5$ (10 μ g Re and 1 g Mo). Conditions were determined for the quantitative separation of rhenium from the impurities, then the color reaction was chosen for the colorimetric determination of rhenium. A thiocyanate complex of rhenium was obtained directly in the desorbate, i.e., perchloric acid after first reducing rhenium with stannous chloride. The data obtained show that the proposed technique gives satisfactory results for Re contents of 0.01 - 0.0001%. Orig. art. has: 1 table.

ASSOCIATION: None

SUBMITTED: 05Aug64

ENCL: 00

SUB CODE: IC,GC

NO REF SOV: 007

OTHER: 001

Cord 2/2

PLONIKOV, V. K.

L 65155-65 EWT(m)/EPA(w)-2/EWA(m)-2 Pt-7/Fab-10 IJP(c) OS

ACCESSION NR: AT5007934 S/0000/64/000/000/0462/0467

AUTHOR: Kapchinskiy, I. M.; Kul'man, V. G.; Lazarev, N. V.; Murin, B. P.;
Nevyazhskiy, I. Kh.; Plotnikov, V. K.; Polyakov, B. I.

TITLE: Design of an injector for the 70-Gev proton synchrotron

SOURCE: International Conference on High Energy Accelerators. Dubna, 1963.
Trudy. Moscow, Atomizdat, 1964, 462-467

TOPIC TAGS: high energy accelerator, proton synchrotron, proton accelerator

ABSTRACT: The injector of the 70-Gev proton synchrotron is a strong-focusing linear accelerator, which consists of three cylindrical resonators with drift tubes. The proton beam is generated by a duaplasmatron and is preliminarily accelerated in an electrostatic shock tube up to 700-kev. The high-voltage source for the tube is a pulse transformer. The fore-injector was developed by the NIIEFA GKAE SSSR. The proton energy at the injector's output is assumed to be 100 Mev, which, on the one hand, ensures the capture of the particles into the synchrotron state at an initial field strength in the ring chamber of 75 gauss, and, on the other hand, permits the maintenance, along the entire length of the injector, of a monotypic accelerating

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ACCESSION NR: AT5007934

system without substantial lowering of the shunt-impedance at the ring's output. The phase volume of the beam is connected with the emittance of the beam by the relation $V = \frac{\beta}{\sqrt{1-\beta^2}}$ and is an invariant quantity. A similar relation exists,

between the capacity and the acceptance of the channel. The specific acceleration is the ratio of the increment of energy of a synchronous particle per wave length to the rest energy. The synchronous phase is read off from the maximum of the field. The shunt-impedance is measured as the quotient of twice the high-frequency power loss in the copper divided by the square of the amplitude of the accelerating field. Values of the shunt-impedances and of the Q factor are taken with a three-halves allowance relative to the computed quantities. The frequency of the accelerating field was chosen lower than that in the injectors of the proton synchrotrons of CERN and Brookhaven. The choice of a 150 mc frequency was dictated mainly by the desire to obtain sufficiently high capacity for the channel. The length and, correspondingly, the cost of the injector were therefore increased somewhat, which, however, is compensated by a lowering of the high-frequency power loss in the resonators. The capacity of the focusing channel equals 0.4 cm·millirad, which ensures the possibility of raising the output current of the injector up to 100 milliamperes for a beam phase volume of 0.1 cm·millirad (I. H. Kapchinskiy, *Atommaya*

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energiya, 13, 235 (1962)). For the chosen values of the specific acceleration and of the synchronous phase, the longitudinal Coulomb repulsion does not limit the beam current until the extreme space charge values are reached, which are determined by the transverse lateral repulsion (I. M. Kapchinskiy, A. S. Kronrod, present conference, p. 906). It is assumed that the acceleration will be mainly due to the energy preliminarily stored in the resonators. The field drop during the 12 μ sec proton pulse amounts to approximately 15% and will be corrected by the generator's focusing during the proton current pulse, for which standby power is provided. In addition, it is proposed that the initial value of the synchronous phase should be increased. The capacity of the synchrotron's ring chamber equals 1 cm-millirad, which permits realization of a three-revolution injection of about 40 μ sec duration for a correspondingly lower beam current. Such an injection scheme is provided as an alternative to other schemes. The present report discusses in detail the radio engineering aspects of the system, the focusing system, and the design. "The design of the injector was carried out under the scientific guidance of V. V. Vladimirovskiy and A. L. Mintz. The design was developed by the joint participation

of the following associates of the Institute of Theoretical and Experimental Physics, GKAE SSSR, the Radio Engineering Institute AN SSSR, the Scientific Research Institute of Electro-physical Equipment imeni D. V. Yefremov GKAE SSSR and other organizations: M. I. Basalov, V. A. Batulin, Yu. P. Vakhrushin, Ye. M. Demil'tsev.

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L 46155-65

ACCESSION NR: AT5007934

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A. A. Zhdanko, F. G. Zheleznikov, N. M. Kristi, N. I. Kisin, N. V. Kovalev, K. M. Kozlov, N. S. Podoyntsyn, A. V. Popkovich, I. M. Royfe, V. F. Semenov, A. V. Solnyshkov, N. K. Titov, and others. Orig. art. has: 2 figures, 2 tables.

ASSOCIATION: Radiotekhnicheskiy institut AN SSSR (Radio Engineering Institute, AN SSSR)

SUBMITTED: 26 May 64

ENCL: 00

SUB CODE: NP

NO REF SOV: 005

OTHER: 000

Cord 4/4

USSR/Farm Animals. Swine.

Q-2

Abs Jour: Ref Zhur - Biol., No. 22, 1958, 101169

Author : Plotnikov, V.K.

Inst : -

Title : Fattening of Swine with Perilla Oil Meal.

Orig Pub: S. kh. Povolzh'ya, 1957, No. 12, 82-83

Abstract: For a 2-month period, 3 groups of 4-month-old pigs were fattened. Average daily weight gains of pigs which received 12.2 and 15.6 percent of Perilla oil meal amounted to 541 and 573 g, whereas pigs which received 14.1 percent of sunflower oil cake showed average daily weight gains of only 517 g.

Card 1/1

KAPCHINSKIY, I.M.; PLOTNIKOV, V.K.

Magnetic quadrupole lenses for a linear accelerator with drift tubes. Part. 1: Required lens properties and choice of pole tip shapes. Prib. i tekhn. eksp. 8 no. 3:15-19 My-Je '63.

(MIRA 16:9)

1. Institut teoreticheskoy i eksperimental'noy fiziki AN SSSR.
(Magnetic instruments) (Particle accelerators)

USSR / Farm Animals. Swine.

Q

Abs Jour : Ref Zhur - Biologiya, No 5, 1959, No. 21271

Author : Plotnikov, V. K.; Gorin, V. Ya.
Inst : Scientific Research Institute of South-East Agriculture
Title : The Fattening of Pigs with Dry Concentrated Feeds
from Self-Feeders

Orig Pub : Byul. nauchno-tekhn. inform. N.-1. in-ta, s.-kh.
Yugo-Vostoka, 1958, No 3, 6-7

Abstract : The pigs which consumed dry fodder from self-feeders, increased their weight during the 122 days of the experiment by 6.9 kg (10 percent) more, and expended 0.5 (10.7 percent) less feed units per 1 kg of weight gain than pigs which were fed the usual thickly mixed fodder. Finely ground fodder was consumed by the pigs more readily than coarsely ground fodder. -- A. D. Musin

Card 1/1

PLOTNIKOV, V.K.

Plotnikov, V.K. -- "Errors in the Location of Points and Methods for Their Calculation in Geodesy." Cand Tech Sci, Moscow Inst of Engineers for the Organization of Land Exploitation, Moscow 1953. (Referativnyy Zhurnal--Matematika, Jan 54)

SO: SUM 168, 22 July 1954

DANIL'TSEV, Ye.N.; PLOTNIKOV, V.K.

Magnetic quadrupole lenses for a linear accelerator with drift tubes. Part 2: Measuring the field nonlinearities of lenses with plane-tipped poles. Prib. i tekhn. eksp. 8 no.3:20-24 My-Je '63. (MIRA 16:9)

1. Institut teoreticheskoy i eksperimental'noy fiziki AN SSSR.
(Magnetic instruments) (Particle accelerators)

37783

S/120/62/000/002/005/047
E039/E420

24.6731

AUTHOR: Plotnikov, V.K.

TITLE: On the choice of type of poles in quadrupolar lenses

PERIODICAL: Pribery i tekhnika eksperimenta,⁷ no.2, 1962, 29-33

TEXT: For focusing beams of charged particles in linear accelerators, magnetic and electrostatic quadrupolar lenses are often used. In the paper are stated the results of calculations on nonlinear fields of quadrupolar lenses used in linear accelerators. Conclusions:

(1) In the case when the permissible nonlinearity is of the order of 5%, it is more profitable to use plane poles as the lens will then have smaller dimensions and weight (particularly in the magnetic case) and will be simpler to construct than a lens with hyperbolic poles. ✓

(2) In the case when the permissible nonlinearity is of the order of a fraction of one per cent there are two possibilities:

a) the use of hyperbolic poles with a large diameter lens permits the attainment of very small nonlinearity; b) the use of plane poles but only using that part of the aperture where the

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On the choice of type ...

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E039/E420

nonlinearity is sufficiently small. The overall dimensions in this case can still be smaller than for the hyperbolic case but there will be a significant increase in the number of ampere turns for the magnetic lens or, in the electric field, for the electrostatic lens.

A large part of the numerical calculations were performed on an electronic computer. Calculations for the case of no aberration in a short lens with saturated poles are given in an appendix. There are 3 figures. X

ASSOCIATION: Institut teoreticheskoy i eksperimental'noy fiziki
AN SSSR (Institute of Theoretical and Experimental
Physics, AS USSR)

SUBMITTED: July 6, 1961

Card 2/2

L 13372-63

BDS/EWT(1)/EWT(m)/ES(w)-2

AFFTC/ASD/SSD Pab-4

ACCESSION NR: AP3002712

S/0120/63/000/003/0015/0019

AUTHOR: Kapchinskiy, I. M., Plotnikov, V. K.

61
60

TITLE: Magnetic quadrupole lenses for drift-tube type linear accelerators. 19 .
1. Lens requirements and selection of pole-piece shape

SOURCE: Pribery* 1 tekhnika eksperimenta, no. 3, 1963, 15-19

TOPIC TAGS: magnetic quadrupole lens, linear accelerator

ABSTRACT: The problem of tolerable nonlinearity of the magnetic field in the quadrupole lenses is studied theoretically. Limitations are considered which are imposed on the shape of pole pieces by the small value of ratio of the drift-tube outside diameter to the aperture diameter. The authors find that: (1) with the number of focusing periods τ , the tolerable field deviation from linear, at the edge of the beam-occupied region, is $\Delta H/H \approx 45/\tau\%$; (2) the smallest size of the drift tubes is associated with the flat-pole lenses; the pole size should be so proportioned that the coefficient at the 5-th harmonic of the magnetic field expansion is zero. The flat-pole lenses are simple to manufacture

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ACCESSION NR: AP3002712

and yield greater (as compared with the hyperbolic-pole lenses) maximum gradients because the working flux is smaller and the saturation occurs at stronger fields. Orig. art. has: 4 figures and 22 formulas.

ASSOCIATION: Institut teoreticheskoy i eksperimental'noy fiziki
(Institute of the Theoretical and Experimental Physics)

SUBMITTED: 16Jul62

DATE ACQ: 12Jul62

ENCL: 00

SUB CODE: NS, SD

NO REF SOV: 002

OTHER: 001

Card 2/2

L 13374-63 BDS/EWT(1)/EWT(m) AFFTC/ASD IJP(C)

ACCESSION NR: AP3002713

S/0120/63/000/003/0020/0024

AUTHOR: Danil'tsev, Ye. N.; Plotnikov, V. K.

TITLE: Magnetic quadrupole lenses for drift-tube linear accelerators.

2. Measurement of the field nonlinearity of flat-pole lenses

SOURCE: Pribery* i tekhnika eksperimenta, no. 3, 1963, 20-24

TOPIC TAGS: magnetic quadrupole lens, linear accelerator

ABSTRACT: Methods for nonlinearity measurements by means of harmonic coils are described. Results are submitted of field measurements on flat-pole lenses with the suppressed 5-th harmonic of the field. The flat pole shape is compared to the pole shape of the CERN linear accelerator. A method is described of correcting the field distortions caused by the winding and the deviation of actual pole shape from theoretical. The authors find that: (1) the above field distortion is usually very small; (2) by varying the pole width, the correction can be readily introduced; (3) flat poles are superior to those used in the CERN accelerator as far as field nonlinearity is concerned. "In conclusion, the authors are thankful

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ACCESSION NR: AP3002713

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to I. M. Kapchinskiy, under whose supervision the work was done, to G.N. Yeritsyan and V. I. Moguchev, who took part in developing the measuring methods, and also to the group of mathematicians under R. S. Quter who supplied the numerical calculation of the correcting curve." Orig. art. has: 4 figures, 13 formulas, and 1 table.

ASSOCIATION: Institut teoreticheskoy i eksperimental'noy fiziki (Institute of the Theoretical and Experimental Physics)

SUBMITTED: 16Jul62

DATE ACQ: 12Jul63

ENCL: 00

SUB CODE: NS, SD

NO REF SOV: 003

OTHER: 000

Card 2/2

BESSUDNOV, Boris Fedorovich, dots., kand. tekhn. nauk; FEDYAYEV,
Leonid Georgiyevich, dots., kand. tekhn. nauk;
PLOTNIKOV, V.L., dots., kand. tekhn. nauk, retsenzent;
VASIL'YEV, B.A., inzh., retsenzent; ANFILOGOV, A.V., red.

[Lumbering machinery and equipment; a textbook] Mashiny i
oborudovanie lesorazrabotok; uchebnoe posobie. Pod obshchei
red. B.F.Bessudnova. Leningrad, Leningr. lesotekhn. akad.
Pt.1. 1965. 157 p. (MIRA 19:1)

PLOTNIKOV, V. L.

PLOTNIKOV, V. L. "Investigation of the Basic Operational Properties of Seamless Pressed-Wood Plastic for the Anti-Friction Material in Slide Bearings." Min Higher Education USSR. Leningrad Order of Lenin Forestry Engineering Academy imeni S. M. Kirov. Leningrad, 1956. (Dissertation for the Degree of Candidate in Sciences)
TECHNICAL

So: Knizhnava Letopis', No. 17, 1956

PLOTNIKOV, Valeriy Leonidovich, dots., kand. tekhn. nauk; DROZDOV, N.S., dots., kand. tekhn. nauk, retsenzent; KOPTELOV, V.S., inzh., retsenzent; BECHUDNOV, E.F., dots., kand. tekhn. nauk, otv. red.; KIRILLOVA, L.D., red.; URITSKAYA, A.D., tekhn. red.

[Machines and equipment in forest exploitation] Mashiny i oborudovanie lesorazrabotok. Leningrad. No.1. [Portable mechanized instruments] Ruchnoi mekhanizirovannyi instrument; uchebnoe posobie dlia studentov lesomekhanicheskogo i leso-inzhenernogo fakul'tetov. 1961. 49 p. (MIRA 16:4)

1. Leningrad. Vsesoyuznyy zaochnyy lesotekhnicheskii institut.
(Lumbering--Machinery)

PLOTNIKOV, V.M., inzh.

Checking the light intensity of fluorescent lamps in use.
Svetotekhnika 6 no.10:23-24 0 '60. (MIRA 13:9)

1. Leningradskoye otdeleniye Gosudarstvennogo proyektnogo
instituta "Tyashpromoelektroproyekt."
(Fluorescent lamps—Testing)

PLOTNIKOV, V.M., inzh.

Testing of light fixtures under simulated operating conditions.
Svetotekhnika 6 no.9:14-17. S '60. (MIRA 13:9)

1. Leningradskoye proyektno-eksperimental'noye otdeleniye Gosudarstvennogo proyektного instituta "Tyazhpromelektroproyekt."
(Electric light fixtures--Testing)

ACC NR: AT6021751

SOURCE CODE: UR/0000/66/000/000/0229/0235

AUTHOR: Plotnikov, V. M.; Kupetskiy, I. V.

ORG: none

TITLE: Problems in the design and construction of throttle-controlled gas flow sensors using a branched noncirculating flow

SOURCE: AN SSSR. Institut avtomatiki i telemekhaniki. Pnevmoavtomatika (Pneumatic automation). Moscow, Izd-vo Nauka, 1966., 229-235

TOPIC TAGS: pressure transducer, flow meter, flow measurement, gas flow

ABSTRACT: A gas flow sensor based on the detection of differential pressure across a fixed throttle in a gas line is discussed. The authors describe the device, calculate its parameters, and report construction details and performance of a sensor constructed using the configuration shown in Fig. 1. The servo system of the sensor is contained in enclosure 8, and consists of two chambers (+) and (-), separated by diaphragm 6. Nozzle 7 provides an outlet from the (+) chamber, which, through turbulent flow throttle DP_1 is connected with the upstream portion of the gas line at pressure P_1 . The lower chamber is connected directly to the downstream portion of the gas line at pressure P_2 . The upper (+) chamber is vented through nozzle 7 and the linear adjustable throttle DP_2 into the exhaust pipe. The device operates as follows: A pressure $P_1 - P_2$ is generated by gasflow (G') through the sensor. The same pressure

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ACC NR: AT6021751

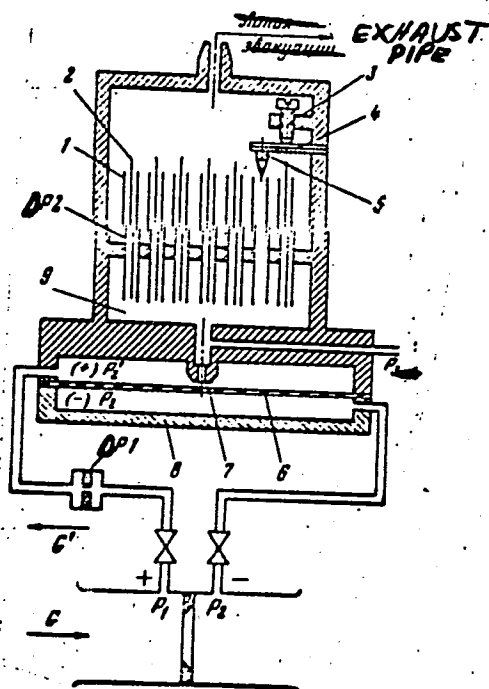


Fig. 1.

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ACC NR: AT6021751

differential also exists across the throttle DP_1 , since the servo system maintains in the upper chamber the same pressure as that in the lower chamber. Gas flow (G') through throttle DP_1 due to this difference in pressure is proportional to the flow (G) through the main throttle in the gas line because of the similarity of the flow characteristics through both devices. The branched gas flow creates an excess pressure P_3 in chamber 9 due to the gas passage through linear throttle DP_2 . This excess pressure is measured by the sensor output, indicating the total gas flow in the line. Temperature compensation is accomplished through the bimetal element 4 and needle valve 5 equipped with an adjusting screw. The output is in the range of 0 to 1.0 or 0 to 0.8 kg/sq.cm. Orig. art. has: 6 figures, 15 formulas.

SUB CODE: 13,²⁰~~1~~/ SUBM DATE: 03Feb66/ ORIG REF: 006/ OTH REF: 001

Card 3/3

21803

S/103/61/022/004/010/014
B116/B212

16.9500 (1043, 1121, 1132)

AUTHORS: Borodin, Yu. I., Plotnikov, V. N. (Moscow)

TITLE: Calculation of automatic control systems

PERIODICAL: Avtomatika i telemekhanika, v. 22, no. 4, 1961, 511-523

TEXT: A method is brought to calculate automatic control systems without a delay for objects of first and second order. This method may be applied to four different control types, and is generalized for systems with a delay. Nomographs are brought for selecting parameters of a wanted transfer function and for determining the controller type. The paper deals with the P-controller, I-controller, PI-controller, and PID-controller. The method applied realizes the synthesis of correction devices in automatic control systems, which is based on the selection of wanted logarithmic amplitude characteristic. Fig. 1a shows the circuit diagram of such an automatic control system. It consists of a controlled object having a transfer function $K_o W_o(s)$ and a controller having a transfer function $K_p W_p(s)$ but its type and parameter are unknown. The transfer function of many objects may be expressed by a formula given in Table 1. Table 2 shows the transfer function.

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tions of the control types mentioned. Primary characteristic values, which characterize the automatic stabilization system (Fig. 1b) are: 1) The maximum deviation $x_{\max}$ caused by a stepwise single interference; 2) the time T of the transient process caused by the same interference; 3) the time t_p where the deviation will reach a maximum; 4) the relative dynamic deviation $\eta_s = x_{21}/x_{11}$ (curve 1 of Fig. 1b represents the static system) resp. $\eta_a = x_{22}/x_{\max}$ (for the astatic system curve 2) of the controlled variable which characterizes the form of the transient process; 5) the static error x_{st} , which is characterized by the deviation of the controlled variable from the rated value after the transient process caused by the stepwise single interference has ended. Figs. 2, 3, and 4 show nomographs which may be used to select wanted transfer functions of a closed system. They give an interrelation between the parameters of the transient process and the transfer function of the closed automatic control system. The transfer functions $Y(s)$ of an automatic control system are shown in Table 3 for objects and controllers investigated. The nomographs have been constructed by using formulas that determine the relation between T , $x_{\max}$,

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t_p , and η , and the parameters K , T_1 , and ζ_1 (Table 4) of the transfer function for a closed system. These formulas have been obtained by the inverse Laplace transformation. The nomograph shown in Fig. 2 has been constructed for the transfer function (10), that of Fig. 3 for (11) and that of Fig. 4 for (12). Figs. 5 and 6 show the nomographs for determining the type of controller by selecting a wanted transfer function of a closed system and by taking the transfer function of the object into account. Formula (8) in Table 2 is valid for a PID-controller. The PI-controller, formula (7), and the I-controller, formula (6) are considered to be special cases of the PID-controller. If the wanted transfer function has to be selected for first objects without delay the nomographs of Figs. 3 and 5 have to be used jointly (superposed), and the control parameters will be determined from the equations

$$\tau_p^2 = T_1^2 - \frac{K}{K_0} T_0 \quad \text{and} \quad 2\zeta_p \tau_p = 2\zeta_1 T_1 - \frac{K}{K_0} \quad (17).$$

The nomographs of Figs. 4 and 6 are used jointly for second order objects without delay and the control parameters are determined from the equation

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$$T_o^2 \frac{K}{K_o} = T_1^2, \quad 2\zeta_o T_o \frac{K}{K_o} + \tau_p^2 = T_1^2(1 + 2\zeta_1), \quad \frac{K}{K_o} + 2\zeta_p \tau_p = T_1(1 + 2\zeta_1) \quad (22).$$

For objects with a plain delay, (formulas (3) and (4), Table 1) the nomograph of Fig. 9 is utilized for first order objects and that of Fig. 10 for second order objects. Formula

$$\tau_p^2 = T_1^2 - \frac{K}{K_o} T_o f_{11}, \quad 2\zeta_p \tau_p = 2\zeta_1 T_1 - \frac{K}{K_o} f_{21} \quad (33)$$

will furnish the parameters of controllers with the first order objects and formula

$$\tau_p^2 = T_1^2 - \frac{K}{K_o} T_o f_{12}, \quad 2\zeta_p \tau_p = 2\zeta_1 T_1 - \frac{K}{K_o} f_{22} \quad (36) \text{ those for}$$

second order objects. The corrections f_{11} , f_{21} caused by the delay are given in Table 5 and those for f_{12} , f_{22} in Table 2. There are 11 figures, 6 tables, and 13 references: 10 Soviet-bloc and 3 non-Soviet-bloc. The 2 references to the English-language publications read as follows: Chien K. L., Hrones J. A., Reswick J. B. On the automatic control of generalized passive systems. Trans. ASME, vol. 74, 1952, pp. 175-185; Mulligan J. H.

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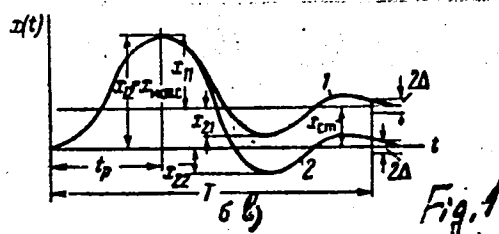
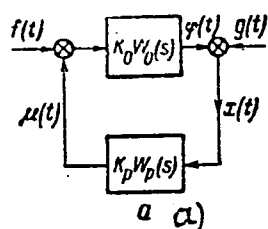
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The effect of pole and zero locations on the transient response of linear dynamic systems. Proc. Inst. of Rad. Eng., vol. 37, May, 1949.

SUBMITTED: October 31, 1960

Legend to Fig. 1: circuit diagram of the automatic control system (a) and the quality indices (b); $g(t)$ denotes the master influence ($g(t) = \text{const}$), $f(t)$ the interference, $\varphi(t)$ the controlled variable, $x(t)$ the deviation of the controlled variable, $\mu(t)$ control influence; $x_{cm} = x_{\text{static}}$, $x_{max} = x_{\text{max}}$.



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Legend to Table 2: 1) controller type; 2) P-controller; 3) I-controller;
4) PI-controller; 5) PID-controller; 6) transfer function $Y(s)$ for a closed system. ✓

Legend to Table 3: 1) type of object; 2) first order; 3) second order;
4) controller type; 5) P-controller; 6) I, PI, PID-controller; 7) transfer function.

Таблица 2

1) Тип регу- лятора	2) О	3) И	4) ОИ	5) ОПИ
6) Передаточная функция $K_p W_p(s)$	K_p (5)	$\frac{K_p}{s}$ (6)	$\frac{K_p (\tau_p s + 1)}{s}$ (7)	$\frac{K_p (\tau_p^2 s^2 + 2\zeta_p \tau_p s + 1)}{s}$ (8)

1)		2)		3)		Таблица 3
Тип объекта		1-го порядка (1)		2-го порядка (2)		
4)	Тип регулятора	5) 0	6) и, он, опи	5) 0	6) и, он, опи	
	Передаточная функция замкнутой системы $Y(s)$	$\frac{K}{T_1 s + 1}$ (9)	$\frac{K s}{T_1^2 s^2 + 2\zeta_1 T_1 s + 1}$ (10)	$\frac{K}{T_1^2 s^2 + 2\zeta_1 T_1 s + 1}$ (11)	$\frac{K s}{(T_1 s + 1)(T_1^2 s^2 + 2\zeta_1 T_1 s + 1)}$ (12)	

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Legend to Table 4: Formulas to calculate t_p/T_1 , T/T_1 , $x_{\max}$, and η . 1) equations are solved numerically; 2) for; 3) $x_{22}/x_{\max}$. In order to determine x_{22} the time t_{p2} has to be found from equation (13) where the first and second maximum occurs and t_{p2} has to be substituted instead of t_p into (14) for $x_{\max}$.

$Y_m(\theta)$	$\frac{K}{T_1^2 s^2 + 2\zeta_1 T_1 s + 1}$	$\frac{K_s}{T_1^2 s^2 + 2\zeta_1 T_1 s + 1}$	$\frac{K_s}{(T_{1s} + 1)(T_1^2 s^2 + 2\zeta_1 T_1 s + 1)}$
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$$\frac{t_p}{T_1}$$

$$\frac{z}{\sqrt{1-\zeta_1^2}}$$

$$\frac{1}{\sqrt{1-\zeta_1^2}} \arctg \frac{\sqrt{1-\zeta_1^2}}{\zeta_1}$$

$$e^{-\frac{t_p}{T_1} - \zeta_1 \frac{t_p}{T_1}} \left(\cos \frac{t_p}{T_1} \sqrt{1-\zeta_1^2} + \right. \\ \left. + \frac{1-\zeta_1}{\sqrt{1-\zeta_1^2}} \sin \frac{t_p}{T_1} \sqrt{1-\zeta_1^2} \right) = 0^\circ \quad (13)$$

для $\zeta_1 < 1$

2

для $\zeta_1 = 1$

$$\frac{t_p}{T_1} e^{-\frac{t_p}{T_1} - \zeta_1 \frac{t_p}{T_1}} \frac{1-\zeta_1 + \sqrt{\zeta_1^2-1}}{2\sqrt{\zeta_1^2-1}} e^{-\frac{t_p}{T_1} (\zeta_1 - \sqrt{\zeta_1^2-1})} + \\ + \frac{1-\zeta_1 - \sqrt{\zeta_1^2-1}}{2\sqrt{\zeta_1^2-1}} e^{-\frac{t_p}{T_1} (\zeta_1 + \sqrt{\zeta_1^2-1})} = 0^\circ$$

для $\zeta_1 > 1$

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$\frac{T}{T_1}$
$-\frac{1}{\zeta_1} \ln \frac{\Delta V \sqrt{1-\zeta_1^2}}{K}$
$-\frac{1}{\zeta_1} \ln \frac{\Delta T_1 \sqrt{1-\zeta_1^2}}{K}$
$e^{-\frac{T}{T_1}} - e^{-\zeta_1 \frac{T}{T_1}} \left(\cos \frac{T}{T_1} \sqrt{1-\zeta_1^2} + \right.$ $\left. + \frac{1-\zeta_1}{\sqrt{1-\zeta_1^2}} \sin \frac{T}{T_1} \sqrt{1-\zeta_1^2} \right) = 0$ $2) \text{ для } \zeta_1 < 1$
$\frac{K}{T_1} \left(\frac{T}{T_1} \right)^2 = 2\Delta e \frac{T}{T_1}$
$e^{-\frac{T}{T_1}} + \frac{\zeta_1 + \sqrt{\zeta_1^2 - 1}}{2\sqrt{\zeta_1^2 - 1}} e^{-\frac{T}{T_1} (\zeta_1 - \sqrt{\zeta_1^2 - 1})} -$ $-\frac{\zeta_1 - \sqrt{\zeta_1^2 - 1}}{2\sqrt{\zeta_1^2 - 1}} e^{-\frac{T}{T_1} (\zeta_1 + \sqrt{\zeta_1^2 - 1})} = \frac{0.1T}{K} (\zeta_1 - 1)$ $2) \text{ для } \zeta_1 > 1$

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Calculation of ...

$x_{\text{манс}}$

$$K \left(1 - e^{-\frac{\pi \zeta_1}{\sqrt{1-\zeta_1^2}}} \right)$$

$$\frac{K}{T_1} e^{-\frac{\zeta_1}{\sqrt{1-\zeta_1^2}} \operatorname{arctg} \frac{\sqrt{1-\zeta_1^2}}{\zeta_1}}$$

$$\frac{K}{T_1^2(1-\zeta_1)} \left[e^{-\frac{t_p}{T_1} - \zeta_1 \frac{t_p}{T_1}} \left(\cos \sqrt{1-\zeta_1^2} \frac{t_p}{T_1} - \frac{1-\zeta_1}{\sqrt{1-\zeta_1^2}} \sin \sqrt{1-\zeta_1^2} \frac{t_p}{T_1} \right) \right] \quad (14)$$

2) для $\zeta_1 < 1$

$$\frac{2K}{\zeta_1^2 T_1}$$

2) для $\zeta_1 = 1$

$$\frac{K}{T_1^2(\zeta_1-1)} \left[-e^{-\frac{t_p}{T_1} + \frac{\zeta_1 + \sqrt{\zeta_1^2-1}}{2\sqrt{\zeta_1^2-1}} \frac{t_p}{T_1}} - \frac{\zeta_1 - \sqrt{\zeta_1^2-1}}{2\sqrt{\zeta_1^2-1}} e^{-\frac{t_p}{T_1} + \frac{\zeta_1 - \sqrt{\zeta_1^2-1}}{2\sqrt{\zeta_1^2-1}} \frac{t_p}{T_1}} \right]$$

2) для $\zeta_1 > 1$

3) $\frac{x_{\text{мн}}}{x_{\text{манс}}}$

Для определе-
ния $x_{\text{мн}}$ следует из
уравнения (13)
найти $t_{\text{р2}}$ — время
наступления второ-
го экстремума — и
подставить $t_{\text{р2}}$
вместо $t_{\text{р}}$ в фор-
мулу (14) для $x_{\text{манс}}$

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Table 5

ζ_1	I_u	I_n
$\zeta_1 < 1$	$e^{-\frac{\zeta_1}{T_1} \tau} \left[\cos \frac{\sqrt{1-\zeta_1^2}}{T_1} \tau - \frac{\zeta_1 - \frac{T_1}{T_0}}{\sqrt{1-\zeta_1^2}} \sin \frac{\sqrt{1-\zeta_1^2}}{T_1} \tau \right]$	$e^{-\frac{\zeta_1}{T_1} \tau} \left[\cos \frac{\sqrt{1-\zeta_1^2}}{T_1} \tau - \frac{\frac{T_0}{T_1} - \zeta_1}{\sqrt{1-\zeta_1^2}} \sin \frac{\sqrt{1-\zeta_1^2}}{T_1} \tau \right]$
$\zeta_1 = 1$	$e^{-\frac{\tau}{T_1}} \left[1 - \frac{\tau}{T_1} \left(1 - \frac{T_1}{T_0} \right) \right]$	$e^{-\frac{\tau}{T_1}} \left[1 + \frac{\tau}{T_1} \left(\frac{T_0}{T_1} - 1 \right) \right]$
$\zeta_1 > 1$	$\frac{1}{2\sqrt{\zeta_1^2-1}} e^{-\frac{\zeta_1}{T_1} \tau} \times \left[\left(\zeta_1 + \sqrt{\zeta_1^2-1} - \frac{T_1}{T_0} \right) e^{\frac{\sqrt{\zeta_1^2-1}}{T_1} \tau} - \left(\zeta_1 - \sqrt{\zeta_1^2-1} - \frac{T_1}{T_0} \right) e^{-\frac{\sqrt{\zeta_1^2-1}}{T_1} \tau} \right]$	$\frac{1}{2\sqrt{\zeta_1^2-1}} e^{-\frac{\zeta_1}{T_1} \tau} \times \left[\left(\zeta_1 + \sqrt{\zeta_1^2-1} - \frac{T_0}{T_1} \right) e^{\frac{\sqrt{\zeta_1^2-1}}{T_1} \tau} - \left(\zeta_1 - \sqrt{\zeta_1^2-1} - \frac{T_0}{T_1} \right) e^{-\frac{\sqrt{\zeta_1^2-1}}{T_1} \tau} \right]$

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Table 5

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Table 6

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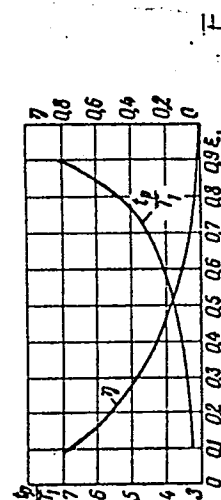
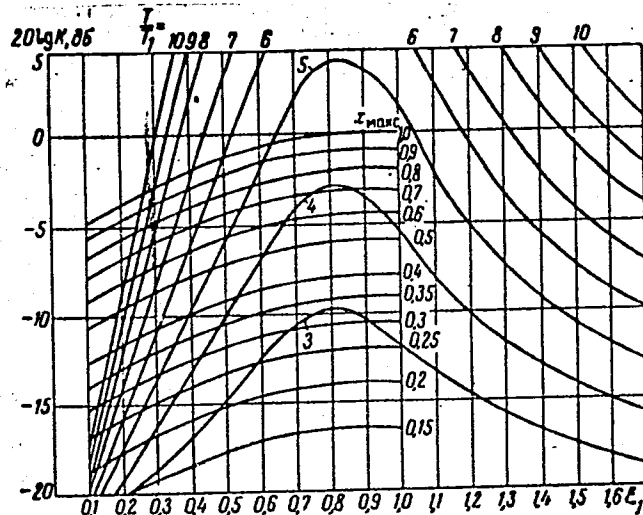
$$\begin{aligned}
 & e^{-\frac{\zeta_1}{T_1} \tau} \left[\left(1 - \frac{T_0^2}{T_1^2} \right) \cos \frac{\sqrt{1-\zeta_1^2}}{T_1} \tau - \frac{2\zeta_0 \frac{T_0}{T_1} - \zeta_1 \left(1 + \frac{T_0^2}{T_1^2} \right)}{\sqrt{1-\zeta_1^2}} \sin \frac{\sqrt{1-\zeta_1^2}}{T_1} \tau \right] \\
 & e^{-\frac{\tau}{T_1}} \left[1 - \frac{T_0^2}{T_1^2} + \frac{\tau}{T_1} \left(1 + \frac{T_0^2}{T_1^2} - 2\zeta_0 \frac{T_0}{T_1} \right) \right] \\
 & \frac{e^{-\frac{\zeta_1}{T_1} \tau}}{2\sqrt{\zeta_1^2-1}} \left\{ e^{\frac{\sqrt{\zeta_1^2-1}}{T_1} \tau} \left[\frac{T_0^2}{T_1^2} (\zeta_1 - \sqrt{\zeta_1^2-1}) - 2\zeta_0 \frac{T_0}{T_1} + \zeta_1 + \sqrt{\zeta_1^2-1} \right] - \right. \\
 & \left. - e^{-\frac{\sqrt{\zeta_1^2-1}}{T_1} \tau} \left[\frac{T_0^2}{T_1^2} (\zeta_1 + \sqrt{\zeta_1^2-1}) - 2\zeta_0 \frac{T_0}{T_1} + \zeta_1 - \sqrt{\zeta_1^2-1} \right] \right\}
 \end{aligned}$$

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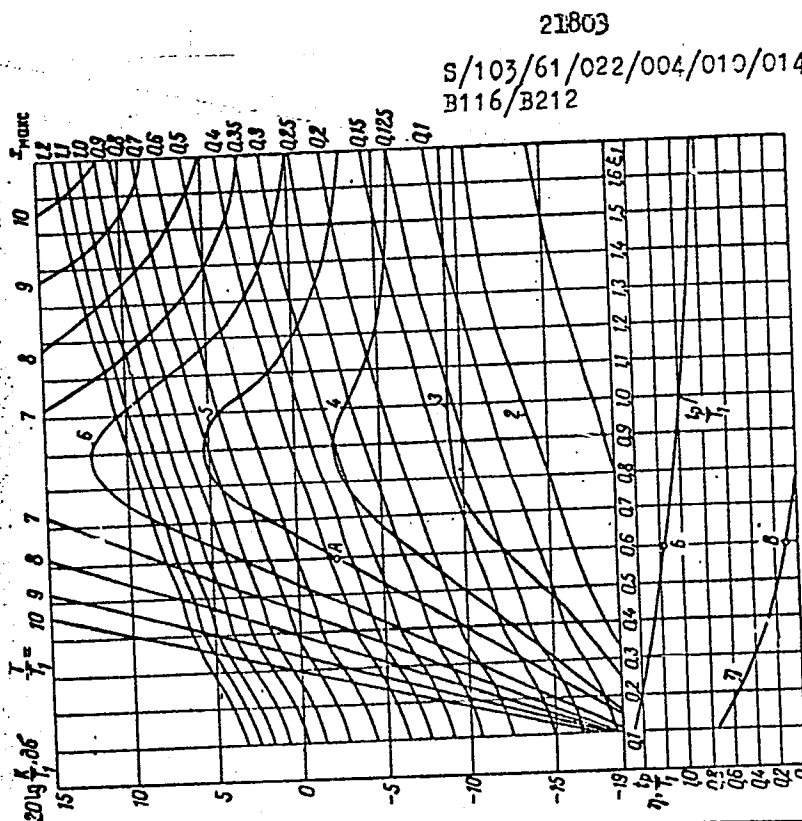
Legend to Fig. 2: Nomographs to select the wanted transfer function of a closed automatic control system of second order (static control)



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Legend to Fig. 3:
Same as Fig. 2
(astatic control)

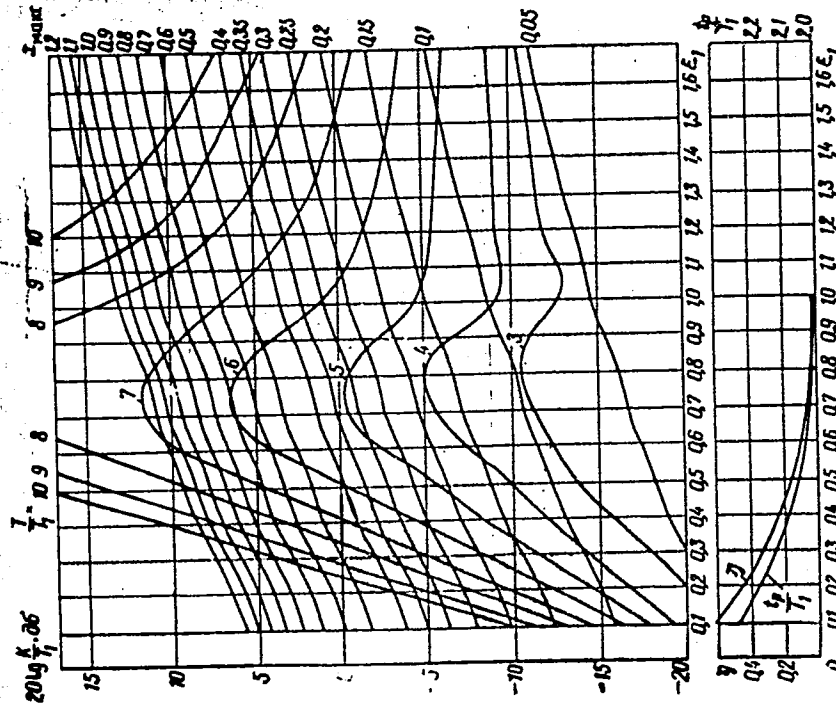


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Legend to Fig. 4:
Same as Fig. 2 but
third order
(astatic control)



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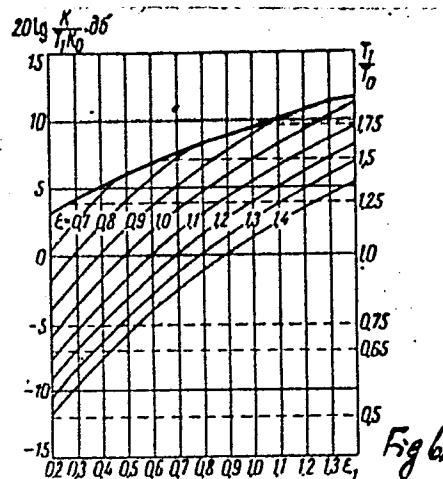
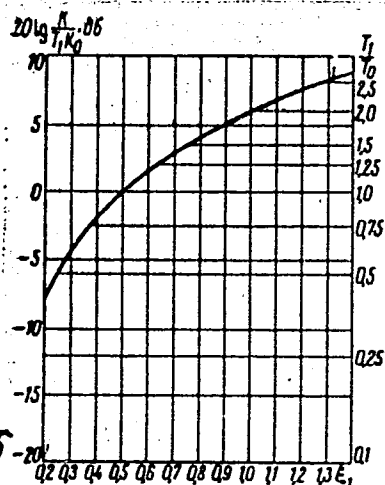
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Legend to Fig. 5: Nomograph to determine the control type for first order objects without delay

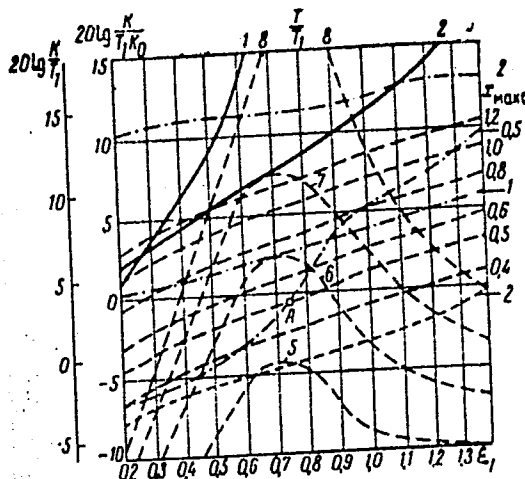
Legend to Fig. 6: Same as Fig. 5 but for second order objects.



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Legend to Fig. 9: Nomograph to determine the controller type for first order objects with delay.



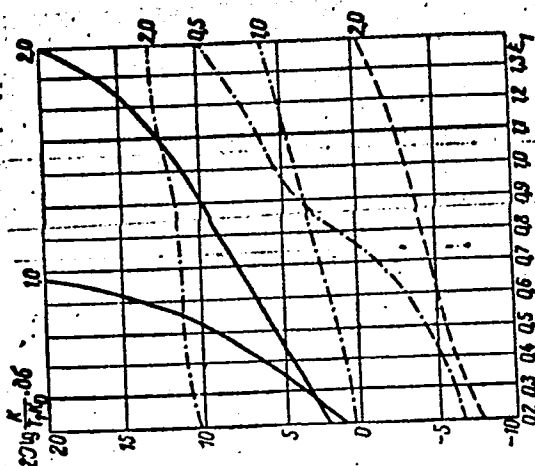
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Legend to Fig. 10: Same as Fig. 9 but only for second order objects.



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PLOTNIKOV, V. M.

Performance of a two-phase asynchronous engine in case of increased voltage in its winding. Nauch.dokl.vys.shkoly; mash. i prib. no.1:100-106 '59. (MIRA 12:8)

1. Stat'ya predstavlena kafedroy "Avtomatika i telemekhanika" Moskovskogo vysshego tekhnicheskogo uchilishcha im. Baumana.
(Electric motors, Induction)

PL. Tnikov, V.N.

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PHASE I BOOK EXPLOITATION

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Moscow. Vyssheye tekhnicheskoye uchilishche. Kafedry "Avtomatika i telemekhanika"

Sistemy avtomaticheskogo regulirovaniya i upravleniya; nekotoryye voprosy teorii i tekhniki (Automatic Regulating and Control Systems; Some Problems in Theory and Technology) Moscow, Mashgiz, 1959. 166 p. (Series: Its Trudy, sbornik no. 97) 7,600 copies printed.

Ed.: V.K. Titov, Candidate of Technical Sciences; Tech. Ed.: Z.I. Chernova;
Managing Ed. for Literature on Machine Building and Instrument Making (Mashgiz):
N.V. Pokrovskiy, Engineer.

PURPOSE: The book is intended for teachers in schools of higher education, and for engineers and technicians engaged in problems of automation.

COVERAGE: This collection contains articles on the theory and technique of automatic regulation and control. The problems discussed concern calculation of optimum parameters of low-power servomechanisms, correction of a-c systems and systems of automatic regulation with a delay unit, and the construction of self-adjusting a-c systems. Several methods of improving the dynamic properties of servomechanisms, and methods of approximate investigation of pulse servo-

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Automatic Regulating and Control (Cont.)

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mechanisms, are also explained. Some considerations regarding possible ways of automating butt welding in a random direction are presented. The authors of this collection are all instructors in the department of "Automation and Remote Control" at MVTU imeni Bauman. The articles are based on scientific research work conducted by the department during the last five years. Some personalities are mentioned in each article. References are given after each article.

TABLE OF CONTENTS:

Ulanov, G.M., Doctor of Technical Sciences. Development of the Invariancy Principle and of the Theory of Combined Systems of Regulation and Control

5

According to the author, the theory of invariancy constitutes the basis of the theory of combined automatic systems which depend on two principles:

- 1) regulation and control as a function of deviation;
- 2) regulation and control as a function of load. Mathematical problems of invariancy were developed in the Soviet Union by N.N. Luzin and P.I. Kuznetsov in 1945-1946. In 1948 Academician V.S. Kulebakin established conditions of invariancy with an accuracy up to the free component. Professors A.G. Ivakhnenko,

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Automatic Regulating and Control (Cont.)

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A.J. Kukhtenko and other Ukrainian scientists contributed much to the advancement of the theory and methods of developing combined systems of automatic regulation and control. A tendency to unite the problems of combined systems and of self-adjusting systems appears in the works of V.V. Solodovnikov and A.M. Batkov (1956). The author summarizes the basic ideas of the Soviet scientists on the above problems.

Bibliography

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Shramko, L.S., Candidate of Technical Sciences. Problem of Self-adjusting Systems

15

The author investigates some a-c systems which develop an error signal of the type $U_e(t) \cos \omega t$. This signal, amplified and converted accordingly, is used for the control of certain actuating units (frequently, two-phase induction motors). There are two ways of converting this error signal:

- 1) with demodulation preceding the conversion of the a-c signal;
- 2) without intermediate demodulation

The author considers systems of the second type the more advantageous because of the absence of additional demodulating and modulating devices.

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Automatic Regulating and Control (Cont.)

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He analyzes these systems, describes certain difficulties in their operation (e.g., those due to variations in frequency of the power supply), and concludes that further research on self-adjusting a-c systems should provide useful material for solving the general problem of self-adjusting systems.

Bibliography

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Karabanov, V.A., Candidate of Technical Sciences. Calculation of Optimum Parameters of Low-Capacity Servosystems With a Given Block Diagram

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Bibliography

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Plotnikov, V.N., Candidate of Technical Sciences. Improving the Dynamic Properties of High-speed A-C Servosystems

30

Bibliography

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The authors of the two above articles present: 1) a calculation of optimum low-capacity servosystems with a given block diagram; 2) Some methods for improving the dynamic properties of high-speed a-c servosystems. They recommend reduction of the electromechanical time constant of the motor for the period of the system reaction by increasing the gain factor of the amplifier in the saturation zone. They also

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recommend the use of a two-channel control system for the drive (along the control and excitation windings).

Kavun, Ye.S., Candidate of Technical Sciences. Correcting Devices of A-C Servosystems

The author investigates electromechanical correcting devices which in practical operation are insensitive to changes in carrier frequency, do not require additional demodulators and modulators, and provide the necessary stabilizing effect.

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Bibliography

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Kavun, Ye.S., Candidate of Technical Sciences. Design and Construction of an Electromechanical Correcting Device

The author outlines the sequence of calculations, discusses the selection of the basic components of the correcting device and describes their construction.

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Automatic Regulating and Control (Cont.)

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Guzenko, A.I., Candidate of Technical Sciences. Designing Single-cycle Magnetic Power Amplifiers

85

This article presents a further development of the methods of calculating parameters of magnetic amplifiers containing an external feedback and a bias circuit which were suggested in the two articles given as references. The author presents a practical method of designing a single-cycle magnetic amplifier with a bias and an external feedback assembled from three-rod and toroidal cores.

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Pyatin, Yu.M., Candidate of Technical Sciences. Rational Selection of Parameters of Measuring Bridge Circuits

97

The author demonstrates that matching of bridge parameters with the resistance of the data unit of a Wheatstone measuring bridge system results in a relative and not an absolute power maximum in the measuring device. By this he also shows that K.B. Karandeyev's conclusion (Ref.1) on the inconsistency of Heaviside's optimum conditions is erroneous. The author states that his findings apply to any electric circuit.

Bibliography

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Automatic Regulating and Control (Cont.)

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Pyatin, Yu.M., Candidate of Technical Sciences. Contact Devices of Automatic Systems

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According to its author, the object of this article is the systematized presentation of all information essential for correct selection of the contact system, with consideration for its operating conditions. According to the editor of this collection, this particular article may be of use to students of schools of higher education. There are 9 tables of specifications.

Bibliography

L'vov, N.S., Engineer. Automation of Butt Welding in Random Direction
The author reports on recent developments in the automation of welding processes which attempt to increase the productivity and economy of these processes, with simultaneous improvement of the quality of the welded seam. A review of existing methods of controlling the position of the welding device and basic considerations on the design of automatic welding machines are presented. Some alternative designs of automatic welding machines based on the use of servo-mechanisms are discussed.

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Bibliography

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Card 7/7

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PIOTNIKOV, V.N., kand.tekhn.nauk

Improvement of dynamic characteristics of a.c. servo systems with
a quick response. [Trudy] MVTU no.97:30-51 '59. (MIRA 13:5)
(Servomechanisms)

PLOTNIKOV, V.N.

Increase in the operational reliability of oxygen producing installations with a concurrent decrease in the consumption of electric power. Prom. energ. 16 no.4:22-24 Ap '61.(MIRA 14:9)
(Oxygen) (Electric power)

SOLODOVNIKOV, V.V., prof., doktor tekhn.nauk, red.; BOGOLYUBOV, N.N., akademik, red.; ISHLINSKIY, A.Yu., akademik, red.; KAZAKEVICH, V.V., prof., doktor tekhn.nauk, red.; LYAPUNOV, A.A., prof., doktor fiz.-mat.nauk, red.; PETROV, B.N., red.; POPOV, Ye.P., prof., doktor tekhn.nauk, red.; POSPELOV, G.S., prof., doktor tekhn.nauk, red.; RYABOV, B.A., prof., doktor tekhn.nauk, red.; ANISIMOV, B.V., dotsent, kand.tekhn.nauk, red.; PETROV, V.V., dotsent, doktor tekhn.nauk, red.; PLOTNIKOV, V.N., dotsent, kand.tekhn.nauk, red.; USHAKOV, V.B., doktor tekhn.nauk, red.; POLYAKOV, G.F., red.izd-va; SOKOLOVA, T.F., tekhn.red.

[Automatic control and computer engineering] Avtomaticheskoe upravlenie i vychislitel'naya tekhnika. Moskva, Gos.nauchno-tekhn.izd-vo mashinostroit.lit-ry. No.3. 1960. 489 p.
(MIRA 13:7)

1. Chlen-korrespondent AN SSSR (for B.N.Petrov).
(Automatic control) (Electronic calculating machines)

PLOTNIKOV, V. N., Cand Tech Sci -- (diss) "Broad-Band^{up} Frequency Modulation Based on Moistening of Ferrite Cores." Kiev, 1957. 15 pp with ill (Min of Higher Education Ukr^{SSR}, Kiev Order of Lenin Polytechnic Inst, Chair of Radio-Receiving ~~Appa-~~
~~releases~~ ^{sets}) (KL, 49-57, 113)

28(1)

AUTHOR:

Plotnikov, V.N.

SOV/159-58-3-30/31

TITLE:

The Improvement of Dynamic Properties of Alternating Current Servo Systems

PERIODICAL:

Nauchnyye doklady vysshey shkoly, Mashinostroyeniye i priborostroyeniye, 1958, Nr 3, pp 212-218 (USSR)

ABSTRACT:

The transient process time is one of the quality requirements of automatic control systems. In many cases it is required that the transient process is completed within a minimum of time. Problems of increasing the operating speed of control systems were considered in a number of papers during the past years, whereby the author used linear (Solodovnikov, 1953) and non-linear feedbacks (Lerner 1952; Krug, 1954; Neiswander, McNeal, 1953; Hopkin, 1951). When using non-linear feedbacks, limitations become essential, imposed on the ranges within which the system coordinates and the magnitudes of their derivatives may change. In this paper, the author studies methods permitting in a sufficiently simple manner a reduction

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of the starting time of an automatic control system, whereby also a considerable reduction of the transient process time is achieved (a two-phase, asynchronous motor operating on alternating current is used as an operational element). The application of the aforementioned methods was made for an alternating current instrument servo system, whereby a model of the latter was built by students of the 5th course of the Faculty "Priborostroyeniye" MVTU imeni Bauman (Dept. "Instrument Building" of MVTU imeni Bauman) O.I. Larichev and E.V. Shirvinskiy. In his paper, the author first explains the circuit diagram of the alternating current servo system, shown in figure 1. It consists of the following elements: a sensitive elements, consisting of a bridge with two potentiometers; an electronic ac amplifier; a two-phase asynchronous motor with a reductor. This system has the advantages and disadvantages common to systems working on a carrier frequency. The author then describes the realization

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of processes of optimum shape by means of non-linear coupling. The application of non-linear elements for improving the dynamic properties of control systems is especially effective with relatively great deviations of the controlled magnitude from its given value. For achieving that control processes proceed close to the optimum laws, the control system must be built in such a way that an influence on its input is provided only when the process deviates from the optimum shape. The author describes two methods for reducing the starting time of a servo system: a) by using an amplifier with an increased upper saturation limit and b) by using two channels for the motor control. Figure 8 shows the principal circuits for two-channel motor control. Using an amplifier with an increased upper saturation limit will cut the transient process time by 30-35%. Using the two-channel control will shorten the transient process

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time may be achieved by introducing non-linear elements into the feedback circuit. The starting time of a servo system and thereby also the transient process time may be reduced by applying amplifiers with increased upper saturation limits and by two-channel control networks for two-phase asynchronous motors in combination with a non-linear feedback. There are 4 circuit diagrams, 1 block diagram, 3 graphs and 7 references, 2 of which are American and 5 Soviet.

This article was presented by the Kafedra "Avtomatika i telemekhanika" Moskovskogo vysshego tekhnicheskogo uchilishcha imeni Baumana (Chair "Automation and Remote Controls" of the Moscow Higher Technical School imeni Bauman)

SUBMITTED: February 7, 1958

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PLOTNIKOV, V.N.

ALEKPEROV, V.P., inzh.; ATOVMYAN, I.O., inzh.; ZUYEV, V.I., inzh.; KAVUN, Ye.S., kand.tekhn.nauk; KOGAN, B.Ya., kand.tekhn.nauk; KOPAY-GORA, P.N., kand.tekhn.nauk; KULAKOV, A.A., inzh.; LEBEDEV, A.N., kand.tekhn.nauk; PAPERNOV, A.A., doktor tekhn.nauk; PEL'POR, D.S., doktor tekhn.nauk; PLOTNIKOV, V.N., kand.tekhn.nauk; RUZSKIY, Yu.Ye., kand.tekhn.nauk; SOLODOVNIKOV, V.V., doktor tekhn.nauk; TOPCHYEYEV, Yu.I., kand.tekhn.nauk; ULANOV, G.M., kand.tekhn.nauk; SHRAMKO, L.S., kand.tekhn.nauk; DOBROGURSKIY, S.O., doktor tekhn.nauk, retsenzent; KAZAKOV, V.A., kand.tekhn.nauk, retsenzent; PETROV, V.V., kand.tekhn.nauk, retsenzent; KHAVKIN, G.A., inzh., retsenzent; SOLODOVNIKOV, V.V., prof., doktor tekhn.nauk, red.; VITENBERG, I.M., kand.tekhn.nauk, nauchnyy red.; MOLDAVER, A.I., kand.tekhn.nauk, nauchnyy red.; KHETAGUROV, Ya.A., kand.tekhn.nauk, nauchnyy red.; POLYAKOV, G.F., red.izd-va; KONOVALOV, G.M., red.izd-va; SOKOLOVA, T.F., tekhn.red.

[Fundamentals of automatic control] Osnovy avtomaticheskogo regulirovaniya. Vol.2. [Elements of automatic control systems] Elementy sistem avtomaticheskogo regulirovaniya. Pt 2. [Compensating elements and computer components] Korrektiruiushchie elementy i elementy vychislitel'nykh mashin. Moskva, Gos.nauchno-tekhn. izd-vo mashinostroit.lit-ry. 1959. 453 p. (MIRA 12:4)
(Automatic control) (Electronic apparatus and appliances)
(Electronic calculating machines)

BORODIN, Yu. I. (Moskva); PLOTNIKOV, V. N. (Moskva)

Design of automatic control systems. Avtom. i telem. 22 no.4:511-
523 Ap '61. (MIRA 14:4)

(Automatic control)

PLOTNIKOV, V.S., inzh.

Geometrical calculation of involute splined couplings in gear
clutches. Izv. vys. ucheb. zav.; mashinostr. no.6:21-31 '65.
(MIRA 18:8)

PLOTNIKOV, V.V., podpolkovnik meditsinskoy sluzhby

Medical care for officers' families in a remote garrison. Voen.-
med. zhur. no. 6:23-24 Je '60. (MIRA 13:7)
(MEDICINE, MILITARY)

PLOTNIKOV, V.S.

Method for estimating the proved underground-water reserves of
a large urban water intake. Razved. i okh. nedr 30 no.7:42-47
J1 '64. (MIRA 17:12)

1. Gidrorezhimnaya partiya Geologicheskogo upravleniya Tsentral'-
nykh rayonov.

PLOTNIKOV, V.S.

Geometry of an involute splined joint used in toothed clutches.

Trudy Ural.politekh.inst. no.136:32-44 '64. (MIRA 17:10)

Relative sliding speeds in toothed clutches. Ibid.:45-51

GASHUKOV, V.S.; PLOTNIKOV, V.S.; PODKORYTOV, A.B.; LIRMAN, M.V.

Investigating the performance of some units of the hydraulic
system of the T-157 loader. Trudy Ural.politekh.inst. no.136:
112-119 '64. (MIRA 17:10)

DENISOV, S.I.; KALEDIN, B.F.; PLOTNIKOV, V.S.

Using the UT-34 sealing compound for fastening and hermetic
sealing of parts in cases. Priborostroenie no.1:20-21 Ja '65.
(MIRA 18:3)

ACC NR: AP6036401

SOURCE CODE: UR/0154/66/000/004/0083/0088

AUTHOR: Plotnikov, V. S. (Candidate of technical sciences)

ORG: Moscow Institute of Engineers of Geodesy, Aerial Photography and Cartography
(Moskovskiy institut inzhenerov geodezii, aerofotos"yemki i kartografii)

TITLE: Registering the image of a flying object and the parameters of the camera

SOURCE: IVUZ. Geodeziya i aerofotos"yemka, no. 4, 1966, 83-88

TOPIC TAGS: photographic equipment, high resolution photography, photographic lens, ballistic camera

ABSTRACT: The paper deals with the selection of the characteristics that a camera should possess to adequately register a flying object. The main criterion is the exposure time in lux-seconds. This depends on the brightness of the object and its geometry. The exposure is different for elongated or point-like objects. To register a point-like object, one needs a maximum aperture of the lens and the minimum circle of light dispersion. In daytime the amount of contrast between the object and the background is important. An irregular grain in the film emulsion produces an effect which is analogous to static in photoelectric receivers. This "noise" limits the photographic reproduction of high frequencies, i. e., the resolution of detail. The following is concluded: the contrast between the point-like object and its background sharpens as

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UDC: 528. 71.

ACC NR: AP6036401

the focal distance is increased. At the same time, an increase in focal distance produces greater sensitivity to atmospheric disturbances, vibration, etc. A survey of foreign manufacturers indicates that f_{10} is the maximum useful focal distance. The contrast is furthermore affected by the brightness of the object. The composition of radiation from the sky should be taken into account. Filters should be chosen to fit the film type. Finally, the contrast is dependent on the exposure times needed for photographing the object and the background. This relationship should not be less than unity for making multiple exposures. Orig. art. has: 2 tables, 11 formulas.

SUB CODE: 14/

SUBM DATE: 12Apr66/

ORIG REF: 003/

OTH REF: 001

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L 40551-65 EWT(m)/EPF(c)/EPR/EWP(j)/EWP(v)/T Pc-4/Pr-4/Ps-4 WW/RM
ACCESSION NR: AP5003056 S/0119/65/000/001/0020/0021

AUTHOR: Denisov, S. I.; Kaledin, B. F.; Plotnikov, V. S. 21 B

TITLE: Use of UT-34 sealer for cementing and sealing parts in their settings

SOURCE: Priberostroyeniye, no. 1, 1965, 20-21

TOPIC TAGS: sealer, thiokol sealer / UT-34 sealer

ABSTRACT: Thiokol UT-34 sealer consists of the U-34 paste proper, No. 9 vulcanizing paste, and diphenylguanidine. The sealer is cured at room temperature (in 10-48 hrs) and can withstand -60+130C thereafter. Seven designs illustrate methods of mounting various optical glasses in grooved settings by means of the UT-34 sealer. The rubber-like sealer is recommended for joining parts that have different temperature-expansion coefficients, working under shock conditions, etc. Orig. art. has: 4 figures.

ASSOCIATION: none

SUBMITTED: 00

ENCL: 00

SUB CODE: MT

NO REF SOV: 000

OTHER: 000

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PLOTNIKOV, V.S., kand. tekhn. nauk

Reading systems in instruments with photographic recording of
lower plate readings. Izv. vys. ucheb. zav.; geod. i aerof.
no.4:111-114 '64. (MIRA 18:2)

PARNITSKIY, A.V.; PLOTNIKOV, V.S.

[Design of shafts; a manual] Raschet valov; uchebnoe posobie. Sverdlovsk, Ural'skii politekhn. in-t, 1961. 58 p.
(MIRA 17:9)

SHABUROV, M.S., kand.veterinarnyykh nauk; BASHKATOV, S.F., veterinarnyy vrach; PLOTNIKOV, V.S., veterinarnyy vrach

Influence of nutrition and conditions of care for horses on the course of endemic infectious anemia. Trudy VIEV 22:126-132 '59.
(Horses) (Infectious anemia) (MIRA 13:10)

L 27249-66

ACC NR: AP6009865

SOURCE CODE: UR/0413/66/000/004/0060/0060

AUTHORS: Denisov, S. I.; Shevaldin, P. V.; Plotnikov, V. S.; Kaledin, B. F. 18

ORG: none B

TITLE: Method for fabricating mirrors. Class 32, No. 178957

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 4, 1966, 60

TOPIC TAGS: glass product, grinding

ABSTRACT: This Author Certificate presents a method for fabricating mirrors from glass blanks by grinding and polishing their surfaces with subsequent deposition of a mirror film. To protect the mirror from deformations in the fabrication process and in operation, the glass blanks are first fastened in mounts with hermetic rubber. All the fabrication processes are then carried out and the mirrors are fastened to the products in the same mounts.

SUB CODE:13,11/ SUBM DATE: 31Oct63

Card 1/1 CC

UDC: 666.1.056

PLOTNIKOV, V.S.

Investigating toothed clutches of travel gears of cranes with low-speed shafts. Trudy Ural.politekh.inst. no.104:105-112 161.
(MIRA 14:6)

(Clutches (Machinery))

MIRONOV, Viktor Grigor'yevich; PARNITSKIY, A.B., kand.tekhn.nauk,
retsensent; PLOTNIKOV, V.S., inzh., red.; DUGINA, N.A.,
tekhn.red.

[Manipulators used in forging] Kovochnye manipulyatory.
Moskva, Gos.nauchno-tekhn.isd-vo mashinostroit.lit-ry, 1960.
126 p. (MIRA 13:7)
(Forge shops--Equipment and supplies)

EYDINOV, Mikhail Solomonovich, dots., kand. tekhn. nauk; ZOTOV, B.D., kand.
tekhn. nauk; GOLUBKOV, N.S., inzh.; PLOTNIKOV, V.S., inzh., red.;
DUGINA, N.A., tekhn. red.

[Design of tooth and worm gears] Raschet zubchatykh i cherviachnykh
peredach. Moskva, Gos. nauchno-tekhn. izd-vo mashinostroit. lit-ry,
1961. 215 p. (MIRA 14:7)

(Gearing)

AGAROV, A.I.; PLOTNIKOV, V.V.

Connecting a motor-generator unit to supply two electrolytic circuits.
Suggested by A.I. Agarov, V.V. Plotnikov. Prom. energ. 13 no.7:17-18
Jl '58. (MIRA 11:10)

(Electrolysis)

PLOTNIKOV, ~~EA~~, V. YA.

1
 ✓ Methylene bromide. S. I. Yavorskii, V. Ya. Plotnikov,
 M. A. Shumonova, M. P. Machukina, E. I. Arzavina,
 V. V. Tilibai, G. N. Alekseyev, and V. E. Druzhchenko.
 U.S.S.R. 103,537 May 25, 1965. The bromination of 1,1,1-
 is carried out in the vapor phase over a series of the
 following substances as catalyst: natural Al, Al₂O₃,
 oxides, bromides, and chlorides of metals of groups I, II,
 IV, V, VI, or VII of the periodic table. M. H. Wei.

9
 1-UESd
 1-UEH
 1-UE2c (7)
 2-may

PLOTNIKOV, V. YA.

4
(3)

Methyl bromide hydrate. L. M. Koliman, S. I. Yavorskii, and V. Ya. Plotnikov, *Zhur. Priklad. Khim.* 26, 645-7 (1953).—Shaking MeBr with H_2O at 0-4.5° yields MeBr hydrate, plates, having approx. the compn. $MeBr \cdot 13H_2O$. It decomp. at 10-15° and shows the following vapor pressures: at 5°, 7 mm. H_2O , 363 mm. hydrate; at 10°, 9 and 661; at 13°, 11 and 989; at 15°, 13 and 1117; at 18°, 15 and 1245 mm., resp. The ternary point of co-existence of the hydrate, MeBr liquid and MeBr vapor is 14° at 1060 mm. pressure.

G. M. Kosolapoff

PLOTHNIKOV, Ya.V.; TRIPOL'SKIY, L.G., redaktor; MANINA, M.P., tekhnicheskii
redaktor.

[Young automobilists and motorcyclists on a journey] Puteshestvie
iunyykh avtomobilistov i mototsiklistov. Moskva, Gos.izd-vo "Fiz-
kul'tura i sport," 1954. 90 p. (MIRA 8:5)
(Automobiles--Touring) (Motorcycles--Touring)

L 30965-66 EWA(h)/EWT(1)

ACC NR: AP6001937

SOURCE CODE: UR/0142/65/008/006/0686/0695

AUTHOR: Plotnikov, Ye. M.

52
5

ORG: none

TITLE: Filtration of maser-frequency stability-transition circuits

SOURCE: IVUZ. Radiotekhnika, v. 8, no. 6, 1965, 686-695

TOPIC TAGS: maser, frequency stability, AFC, electronic circuit, filter circuit

ABSTRACT: Two types of frequency-stability transition circuits are theoretically compared: (1) ~~AFC~~ circuit (both frequency-type and phase-locked) and (2) Reference-oscillator-error-subtraction circuit. The phase-locked circuit described by M. L. Stitch et al. (IRE Trans., MTT-8, no. 2, 218, 1960) is regarded as the best of its class. As the effect of AM-causing noise can be radically reduced by amplitude limiters, only the filtration of FM-causing noise is considered. The fluctuation of parameters of resonant circuits of the quartz oscillator, frequency multiplier, IF amplifier, and frequency divider causes noise and is taken into account. The analysis shows that: (1) The AFC circuits are the better of the two

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UDC: 621.378.3

L 30965-66

ACC NR: AP6001937

types because they have a smaller error under equal conditions; (2) The AFC circuit may fall out of step and requires a special frequency controller; these shortcomings, however, can be mitigated by correct design; (3) Experimental verification of the above conclusions and other recommendations given in the article is desirable. Orig. art. has: 4 figures and 25 formulas.

SUB CODE: 20// SUBM DATE: 17Jan64 / ORIG REF: 009 / OTH REF: 001

Card 2/2 CC

PLOTNIKOV, Ye.M.

Transfer functions of some tuned systems for small phase perturbations of the input voltage. Izv. vys. ucheb. zav.; radiotekh. 8 no.1:65-71 Ja-F '65. (MIRA 18:5)

PLOTNIKOV, Ya. Ya., inzh.; RADKEVICH, V.T., inzh.; TONDEL', A.I., inzh.;
KHINEVICH, B.E., inzh.

New continuous trench digger for open-cut drainage. Stroi. i dor.
mash. 10 no.3:4-6 Mr '65. (MIRA 18:5)

PLOTNIKOV, Ya.Ya., inzh.; KHINEVICH, B.E.

The DZU-15 turf cutter and layer. Stroi. i dor. mash. 1^o no.3:
15 Mr '65. (MIRA 18:5)

PLOTNIKOV, Ye.Ye.

We are building for the Virgin Territory. Transp. stroi. 15
no.2:5-7 F '65. (MIRA 18:3)

1. Upravlyayushchiy trestom Tselintranstroy.

PLOTNIKOV, Yu.

BEREZKIN, V.; PLOTNIKOV, Yu.

Driving competitions of young people. Za rul. 15 no.2:
8 P '57. (MLRA 10:5)

1. Direktor Moskovskogo gorodskogo kluba yunyh avtomobilistov
(for Plotnikov).
(Juvenile automobile drivers--Competitions)

PLOTNIKOV, Yu.

The Moscow municipal club of young automobile enthusiasts is now
15 years old. Avt.transp.34 no.3:38 Mr '56. (MLRA 9:7)

1.Direkter Moskovskogo gorodskogo kluba yunyh avtomobilistev.
(Moscow--Automobile drivers)

ZAMSHA, O.I.; PLOTNIKOV, Yu.I.

Cutting crystals with a paper disk. Prib.i tekhn.eksp. no.2:159
Mf-Ap '60. (MIRA 13:7)

1. Moskovskiy inzhenerno-fizicheskiy institut.
(Cutting machines)

PLOTNIKOV, Yu.I.

Temperature dependence of dark currents in anthracene.
Fiz. tver. tela 4 no.11:3104-3109 N '62. (MIRA 15:12)

1. Moskovskiy inzhenerno-fizicheskiy institut.
(Anthracene—Electric properties)

PLOTNIKOV, Yu.I.

Dark electric processes in anthracene. Izv. vys. ucheb. zav.; fiz.
no.6:65-69 '63. (MIRA 17:2)

1. Moskovskiy inzhenerno-fizicheskii institut.

PLOTNIKOV, Yu.I.; GORBATOV, A.A.

Regarding electrometer for studying induced electromotive forces.
Prib. i tekhn. eksp. 8 no.1:92-94 Ja-F '63. (MIRA 16:5)

1. Moskovskiy inzhenerno-fizicheskiy institut.
(Electrometer) (Electromotive force)